

TITLE OF THE INVENTION

Means and a Method for Protecting Deglet Noor Dates

CROSS-REFERENCES TO RELATED APPLICATIONS

This application is a continuation-in-part of Ser. No. 29/034,825, filed Feb.13, 1995 and Ser. No. 09/615,490, filed Feb. 22, 1999, both now abandoned.

STATEMENT REGARDING FEDERALLY SPONSERED RESEARCH AND DEVELOPMENT

Not Applicable

REFERENCE TO A "Microfiche Appendix"

Not Applicable

BACKGROUND OF THE INVENTION

Technical Field

1 This invention relates to a means and method for protecting Deglet Noor dates from birds, rain, insects, wind, and sunburn while on the palm, and in particular to a cover for such purpose which is economical to use.

Background Art

2 The major date variety cultivated in the United States is Deglet Noor, "the Date of Light", known for its beautiful, translucent, amber color and incomparable, delicious flavor. Furthermore, this luxury date is the processing date *par excellence*.

3 In the early 1900's, Deglet Noor offshoots were brought from Algeria and Tunisia to the Coachella Valley in the arid southeast corner of California, where the desert closely resembles its homeland. The mature palms produce heavily; however, carob moth, a species native to the Mediterranean region, which was first discovered here in 1982, infests the crop more every year. This vociferous pest is now well-established amid a wide range of hosts and, in classic fashion, has become resistant to malathion, the only insecticide registered for use on dates. Malathion is an organophosphate pesticide which is relied upon also to control raisin moth and dried-fruit beetles.

4 The introduction of a new insecticide, another "silver bullet", for controlling date pests is highly unlikely given the registration costs, regulatory pressures and environmental implications. Moreover, the hazard to farm workers and the problem of unavoidable drift cause great concern in the community. Protecting dates on the palm with a physical barrier, rather than a broad-spectrum pesticide, would offer many advantages.

5 The design requirements for the ideal date-bunch cover were known to researchers as early as 1935, and elaborated upon in 1949 by D. E. Bliss et al in the classic work, *Date-Bunch Covers and Their Relation to the Fruit-Spoilage Complex of Deglet Noor Dates*: "...waterproof during heavy rains, allowing circulation of air throughout the fruit cluster, requiring minimum handling during fruit picking, excluding insects and birds, and costing only a nominal amount...one that [also] protects the fruit stalk and strands from sunburning". The researchers concluded that the cover must allow maximum aeration because some of the water vapor constantly transpired by the fruit surfaces is trapped by the cover and leads to water injury and fungus infection. The latter requirement, however, was tempered when it was found that excessive aeration in dry years increased the shriveling of the fruit.

6 The first recorded date-bunch cover (1919) in the United States was baglike, made of paper and provided with holes for ventilation. However, if ventilation was adequate, rain protection was poor. And, of course, insects entered the holes. Eventually, a "flap fold", which created a large opening to ventilate the fruit but kept rain out, was substituted for the "breather holes".

7 The best paper available for covers is naturally brown, 55-pound, Kraft, wet-strength paper, which provides excellent rain protection but, unfortunately, absorbs enough heat from the sun to burn the fruitstrands and create a hot house effect that increases fungus spoilage. White paper keeps the bunch cool, but is weakened by the bleaching process. Waterproofing the paper with wax proved very detrimental. Regardless of the color or treatment, unvented paper covers retard the ripening of the fruit because they reduce the rate of transpiration. Even an umbrella-like paper cover traps too much moisture.

8 The paper cover commonly used since the 1950s is a sheet which measures approximately 1.2 meters (48 inches) by 1.2 meters (48 inches). About 0.3 meters (12 inches) of one corner is cut off. The sheet is wrapped in the shape of a cone around as much of the bunch as possible, starting at the top and with the cut corner at the bottom; stapled on one side; and then tied securely to the fruitstalk.

This cover has several major drawbacks: Air circulation is drastically reduced inside most, if not all, of the bunch; the fruit cluster is compressed; insects enter freely; it blows apart during high winds; and, furthermore, in contradistinction to the early tube-shaped covers, it is not reusable.

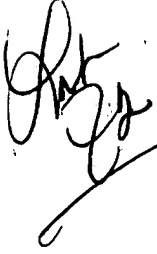
9 Various types of fabric – raw, treated, dipped in insecticides, or waterproofed – have been tried commercially for covering date bunches: burlap; muslin; open-mesh cotton, cotton/polyester and, most recently, polyester.

10 The cloth cover used extensively since the 1980s is tube-shaped, about 1.2 meters (48 inches) long, 1.5 meters (58 inches) in circumference, and made of light-weight, white, woven, open-mesh polyester fabric which resembles mosquito netting. It is slipped around the bottom of the bunch, raised up, puckered at the top and tied securely to the fruitstalk. The bottom of the cover is tied shut to catch dropped fruit and exclude insects, and later opened two or three times for harvesting.

Designed for Medjools, this cover is neither long nor wide enough for Deglet Noors.

11 Combining the paper and cloth covers commonly used today without significant modification restricts aeration and compresses the fruit cluster more than when either is installed separately.

12 U.S. Pat. No. 2,555,561, "Chemically Treated Laundry Bag", discloses a woven, open-mesh fabric bag used in commercial laundering operations, which is made of high-tenacity regenerated cellulose yarn. Unlike mesh fabrics designed for excluding insects, laundry bags must allow the free circulation of liquids and, therefore, require a relatively large mesh as is shown in the drawing.

 13 Conversely, U.S. Pat. No. 5,535,543, "Means and a Method for Thermally Protecting Fruits and Vegetables While Maturing", is directed to a bag that allows water to only seep through. Nowhere in the patent is the material described as mesh. The globular shape and elasticized opening are of no value for protecting dates. The main function of the invention is the opposite of what is required of a date-bunch cover: Insulation is measured by "R" factor, a unit of resistance of motionless air; thermally insulating fruit involves protecting it from contact with outside cold air and wind which cause its internal heat and moisture to dissipate. A bunch of 900 full-grown dates at temperatures between 70° and 122° F must lose several cups of water everyday in the form of water vapor from the stomata of the fruit during ripening. Thermally insulating a date bunch, when free circulation of air is vital, would certainly ruin the fruit.

14 U.S. Pat. No. 4,646,467, "Weather Resistant Cover Bag for Dormant Plants", also teaches a means and method of protecting plants against cold injury. Although the cover would have to be

turned upside down, the shape and size of the bag disclosed is, in fact, perfectly suitable for covering a date-bunch; however, the two layers forming the wall of the bag are designed to limit air and vapor flow enough to create a "dead air pocket" between them. Inside the "closed dark chamber" provided by the cover to prevent premature growth, dates would ripen improperly and eventually rot.

15 Researchers in 1948 experimented with a combination paper-and-cloth cover, composed of a short, white, Kraft paper hood waterproofed with wax, and sewn to a skirt of cotton netting. Despite good aeration and virtually complete protection against insects, this design failed because cotton netting, apparently the only type economical at the time, absorbed moisture with disastrous results.

16 U.S. Pat. Appl. Nos. 29/034,825 and 09/615,490 disclose a two-piece cover, which retains the approximate size of the hood experimented with earlier and substitutes polyester for cotton. In this design, the inner part comprises a sheet of naturally brown, 55-pound, Kraft, wet-strength paper wrapped mainly around the upper portion of the fruit strands. The outer part is a cloth bag, which measures about 1.5 meters (58 inches) long by 0.9 meters (36 inches) wide and comprises a fabric slightly heavier than what is commonly used. Cloth shades the paper, and protects it from high winds. The bottom of the cover is sewn, rather than tied shut, which avoids compressing the fruit cluster and allows dropped fruit to roll into two corners. The only drawback of this cover is the relatively high cost of manufacture and installation.

BRIEF SUMMARY OF THE INVENTION

17 The invention will be hereinafter described as embodied in a cover for Deglet Noor dates, but it is to be understood that the cover of this invention protects any variety of dates, especially those which are picked only once each season and are suitable for on-tree storage.

18 The primary object of the present invention resides in the provision of a physical barrier which fulfills all of the above requirements for the ideal date-bunch cover and is economical to use.

19 Accordingly, the means and method for protecting Deglet Noor dates while on the palm involve enclosing the bunch in a bag that is large enough so as not to compress the fruit cluster, and wrapping or folding the upper portion of the bag in such a manner as to obviate the need for paper. The bag is composed of a flexible fabric which allows free circulation of air, yet excludes insects and birds, provides a windbreak, and partially shades the bunch. The fabric comprises a material which is water-repellant and resists deterioration in prolonged sunlight.

20 Other objects, features and advantages of the present invention will become apparent from the following description and accompanying drawings.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

21 FIG. 1 is a front perspective view of the bag installed on a large date bunch, shown with the upper portion of the bag wrapped around the top of the bunch;

FIG. 2 is a left side perspective view thereof; and

FIG. 3 is a front perspective view thereof installed on a small date bunch, shown with the bag raised and the top folded down.

BEST MODE FOR CARRYING OUT THE INVENTION

22 The present invention comprises the use of a bag-shaped cover for protecting Deglet Noor dates from birds, rain, insects, wind, and sunburn while on the palm, which is composed of a fabric resembling mosquito netting. To fully realize the advantages of the invention, the preferred embodiment includes the installation of the bag in the proper manner and at the right time, as will be described in detail below.

23 Turning now to the Figures, the bag 8 of FIGS. 1 and 2 is shown installed on a large date bunch 7 while on the palm. The bag is made of white, woven, open-mesh polyester fabric weighing about 86 to 113 grams per square meter (2.5 to 3.3 ounces per square yard) and having a cloth count of approximately 13 warps by 10 fills per square centimeter (32 warps by 26 fills per square inch). The bottom and one side 4 are overedged with color-coded thread, so as to positively identify the owner in case of theft. Selvage 3 is at the top. The bag is preferably at least 1.5 meters (58 inches) long by 0.9 meters (36 inches) wide, in order to be of ample size. The large date bunch represented by broken lines is about 0.9 meters (36 inches) long and 0.6 meters (22 inches) diameter at the bottom. The upper portion 5 of the bag 8 is wrapped around the upper portion of the bunch, thereby forming a hood. A twist tie 10 anchors the top of the bag in a tightly closed condition around the bottom of the fruitstalk 1, so as to completely enclose the bunch. The bag sheds rain completely wherever the fabric overlaps 2, 5. The upper portion of the bunch covered in this fashion is also the area needing shade the most.

24 The bag 8 of FIG. 3 is shown installed on a small date bunch 12 while on the palm. The bag is

composed of the same fabric as the bag of FIGS. 1 and 2. The bottom 9 of the bag rests within a few inches of the bottom of the bunch. The middle portion is puckered around the bottom of the fruitstalk. A twist tie, which is hidden from view, anchors approximately the middle of the bag in a tightly closed condition around the bottom of the fruitstalk 1, so as to completely enclose the bunch. The portion of the bag protruding above the twist tie is folded down and over the top of the bunch 6, thereby forming an umbrella-like structure, such that the upper portion of the bunch is shaded and the fruit cluster is protected from rain.

25 There are many advantages to sewing the bottom of the cover, rather than tying it shut: 1) the same amount of fabric accommodates a longer bunch; 2) dropped fruit, which is usually rotten or infested, rolls into the bottom corners of the bag and rests farther away from sound fruit; 3) the installer does not have to tie the bottom of the cover shut; 4) the tent shape keeps the surface of the cover and, thereby, also rain away from the fruit; 5) the fruit cluster is not compressed; and, 6) the bottoms do not have to be untied when stowing the bags after harvest. Fortunately, Deglet Noor dates are harvested only once each season and, therefore, access at the bottom is not required.

26 The bag is necessarily much larger than the tube used on Medjool bunches; however, the cloth tubes formerly used on Deglet Noor bunches were the same size as the cover of the present invention. The reason they were not sewn at the bottom or made longer is probably because shortening the fruitstrands considerably before bagging was standard practice in those days. Since then, growers have found that the fruitstrands can be left longer without compromising quality.

27 When a Deglet Noor bunch is especially large the paper wrap is unable to cover it completely. This allows birds to peck at the exposed dates. The bag is of ample size to enclose the entire bunch.

28 The concentric overlapping layers (hood) and folded-down portion (umbrella) incorporated in the preferred embodiment provide rain protection equal to wet-strength paper. Moreover, the bag cannot be blown apart during high winds, as is often the case with the paper wrap. Under humid conditions, the bag is of advantage because moisture is not trapped.

29 Unlike the paper wrap, the bag of the present invention is reusable. Polyester, the preferred fiber for the fabric, is strong, water-repellant, resistant to ultraviolet rays (UV), and relatively inexpensive. However, polyester will rot if allowed to rest on damp ground. The serviceable life of the bag with proper care is at least ten years.

30 The greatest advantage offered by the present invention is protection against insects. Presently,

the pesticide of choice is ineffective, and no substitute is registered for use on dates. Infestation can easily be kept below 2% when bagging the bunches, compared with typically 10%, and as high as 40%, using the paper wrap and malathion. The latter percentages do not include the considerable amount of infested fruit that falls to the ground before and during harvest.

31 When malathion was effective, the use of the paper wrap was not widely questioned. Now, however, yield is being drastically reduced. Carob moth has become as great a threat to conventional date growers as to those farming organically. While the microenvironment inside the bag is conducive to the production of high quality fruit, nothing overwhelmingly positive is known about wrapping paper around dates – unless the goal is to protect the bunch only from birds and rain, and allow the introduction of a pesticide. The practice is actually a recipe for lowering quality.

32 The desiccation of fruitstrands is unavoidable with the paper wrap. Heat from direct sunlight is absorbed and transfers through to the bare upper portion of the strands the paper rests upon. The flow of fluids is cut off and shriveling of fruit occurs along the strand.

33 Other quality-related advantages of the present invention are earlier and more even ripening. This results from the fact that paper retards the rate of transpiration and, therefore, the driving force of ripening to the degree that the dates are covered. Since the bunch is never affected equally under the paper cover, and often not at all on the bottom, uneven ripening occurs. The bag allows free circulation of air throughout the fruit cluster. Increased uniformity is a boon to packers because the dates are then easier to grade and more attractive to customers.

34 On-tree storage of Deglet Noor dates is made possible with the present invention because protection against birds, insects and high winds is adequate.

35 The manner of installing the cover of the present invention is similar to that of the tube-shaped cover for Medjool bunches. The main difference lies the effort given to forming either a hood or umbrella-like structure at top, rather than tying shut the bottom. The means of fastening the cover to the fruitstalk are the same.

36 A hood should be formed on large bunches, because they have a length such that not enough of the bag can be folded down over the top to provide an effective rain barrier. Forming the hood is accomplished by centering the top of the bag around and a few inches above the top of the bunch with a corner in each hand, and then folding both sides in the same direction with a spiraling motion that forms concentric overlapping layers around the upper portion of the bunch. This necessitates

switching hands as the corners spiral around the fruitstalk. Wrapping the fabric around the upper portion of the bunch requires skill like installing the paper wrap and, therefore, takes practice.

37 An umbrella-like structure should be formed on small to medium size bunches because it is easier to make but just as effective against rain. The bag should be centered around the bunch and, preferably, positioned such that the bottom is at least a few inches below the bottom of the bunch. The middle of the bag is then puckered where it meets the bottom of the fruitstalk and securely tied. Finally, the top portion of the bag, which protrudes above the twist tie, is folded down and over the top of the bunch. The entire operation is simple and requires little skill.

38 The time of installation is governed by four rules: 1) Never before sulfur dusting, 2) Wait until after the peak of "June Drop", 3) Taller palms first, and 4) Finish before the tips of the dates start to soften. Regardless of when the bag is installed, the bunch should always be shaken vigorously, the fruitstrands spread, and the center opened to get rid of trash fruit which is usually infested. Bagging does not interfere with mite control, nor require changes in any other pre-harvest cultural practices.

39 During harvest, it is of utmost importance that dropped dates caught inside the bag be kept entirely separate from the sound dates on the bunch. Separate containers for this purpose should be available at all times when picking. At least half of these dates will be culls, and such lots will rarely be worth grading. Alternatively, the dropped dates can be dumped on the ground and disced in later.

CONCLUSION

40 The standard for comparing the relative merits of date-bunch covers is stated by D. E. Bliss et al in *The Second Report on Date-Bunch Covers and Their Relation to the Fruit-Spoilage Complex of Deglet Noor Dates* (1950): (a) the effect on the fruit, and (b) economy of use. The superiority of the cover of the present invention over the paper wrap and malathion in terms of effect on the fruit is incontrovertible. Economy of use follows from its unregulated status, easy handling, long serviceable life, and positive identification. Nevertheless, this standard should be expanded to include the impact on beneficial insects. In this respect, the advantage of a physical barrier over a broad-spectrum pesticide is enormous.

41 Accordingly, the present invention provides a means and method for protecting Deglet Noor dates from birds, rain, insects, wind, and sunburn while on the palm, and in particular a cover for such purpose which is economical to use.

42 It will be readily apparent to the those skilled in the art that various changes and modifications of an obvious nature may be made without departing from the scope of the novel concepts of the present invention. For example, the cover can have a different construction, color or size; various fibers can be substituted for polyester; or, the top can be simply puckered around the fruitstalk and anchored in the same manner as the cover for Medjool bunches.

43 Thus the scope of the invention should be determined by the appended claims and their legal equivalents, rather than by the embodiments illustrated.

CLAIMS

I claim:

1. A cover for protecting Deglet Noor dates from birds, rain, insects, wind, and sunburn while on the palm, which comprises:
 - (a) said cover being in the shape of a bag;
 - (b) said bag being of ample size to enclose a bunch;
 - (c) said bag being composed of a flexible fabric which allows free circulation of air throughout the fruit cluster, yet excludes insects and birds, provides a windbreak, and partially shades said bunch;
 - (d) said fabric made of water-repellant, UV resistant fiber; and
 - (e) means for anchoring the top of said bag to the fruitstalk of said bunch.
2. The cover of claim 1 wherein said fabric is white, woven, open-mesh polyester having a weight of about 86 to 113 grams per square meter (2.5 to 3.3 ounces per square yard).
3. The cover of claim 1 wherein said fabric has a cloth count of approximately 13 warps by 10 fills per square centimeter (32 warps by 26 fills per square inch).
4. A method for protecting Deglet Noor dates from birds, rain, insects, wind, and sunburn, while on the palm, which comprises the steps of:
 - (a) providing a cover for said dates, said cover being in the shape of a bag, said bag being of ample size to enclose a bunch and composed of a flexible fabric which allows free circulation of air throughout the fruit cluster, yet excludes insects and birds, provides a windbreak, and partially shades said bunch, said fabric being made of water-repellant, UV resistant fiber;
 - (b) slipping said bag over the bunch;
 - (c) wrapping the upper portion of said bag in a spiraling fashion to form concentric overlapping layers around the upper portion of said bunch, whereby a hood is formed, such that the upper portion of said bunch is shaded, and said fruit cluster is protected from rain; and
 - (d) providing means for anchoring the top of said bag in a tightly closed condition around the bottom of the fruitstalk, so as to completely enclose said bunch.
5. A method for protecting Deglet Noor dates from birds, rain, insects, wind, and sunburn, while on the palm, which comprises the steps of:
 - (a) providing a cover for said dates, said cover being in the shape of a bag, said bag being of

- ample size to enclose a bunch and composed of a flexible fabric which allows free circulation of air throughout the fruit cluster, yet excludes insects and birds, provides a windbreak, and partially shades said bunch, said fabric being made of water-repellant, UV resistant fiber;
- (b) slipping said bag over the bunch;
 - (c) puckering the middle portion of said bag around the bottom of the fruitstalk;
 - (d) providing means for anchoring approximately the middle of said bag in a tightly closed condition around the bottom of said fruitstalk, so as to completely enclose said bunch; and
 - (e) folding down and over the top of said bunch the portion of said bag protruding above where said bag is anchored to said fruitstalk, so as to form an umbrella-like structure, such that the upper portion of said bunch is shaded, and said fruit cluster is protected from rain.

* * * * *

ABSTRACT OF THE DISCLOSURE

A cover in the shape of a bag, which encloses a date bunch and is securely tied to the fruitstalk, excludes insects and protects the dates from birds, heavy rain, high winds, and sunburn while on the palm. The bag is large enough so as not to compress the fruit cluster and is made of a flexible fabric, preferably white, woven, open-mesh polyester, which allows free circulation of air. Layering the fabric around the top of the bunch to form a hood or umbrella-like structure provides shade and rain protection, and obviates the need for paper. Additionally, the bottom and one side of the bag are overedged with color-coded thread for the purpose of identification in case of theft. The manner and time of installation are crucial, and thus described in detail.